33. Memoirs and accounts of the Works and Inventions of any of the following Engineers:—Sir Hugh Myddelton; Arthur Woolf; Jonathan Hornblower; Richard Trevithick; William Murdoch (of Soho); and Alexander Nimmo.

Original Papers, Reports, or Designs, of these or other eminent individuals, are peculiarly valuable for the Library of the Institution.

The communications must be forwarded, on or before the 31st of May, 1845, to the house of the Institution, No. 25, Great George-street, Westminster, where copies of this paper, and any further information may be obtained.

CHARLES MANBY, *Secretary*.

25, Great George-street, Westminster, 1844.

Extracts from the Minutes of Council, February 23rd, 1835.

"The principal subjects for which Premiums will be given, are—

"1st. Descriptions, accompanied by Plans and explanatory Drawings, of any Work in Civil Engineering, as far as absolutely executed; and which shall contain authentic details of the progress of the Work. (Smeaton's Account of the Edystone Lighthouse may be taken as an example.)

"2ndly. Models or Drawings with descriptions of useful Engines and Machines; Plans of Harbours, Bridges, Roads, Rivers, Canals, Mines, &c. Surveys and Sections of Districts of Country.

"3rdly. Practical Essays on subjects connected with Civil Engineering, such as Geology, Mineralogy, Chemistry, Physics, Mechanic Arts, Statistics, Agriculture, &c.; together with Models, Drawings, or Descriptions of any new and useful Apparatus, or Instruments applicable to the purposes of Engineering or Surveying."

Note,—The communications should be legibly written on foolscap paper, on the one side only of each page, leaving a margin of one inch and a half in width on the left side, in order that the sheets may be bound.

The Drawings should give as many details as may be necessary to illustrate the subject, and should be to such a scale that they may be clearly visible when suspended on the walls of the Theatre of the Institution, at the time of reading the communication.

Papers which have been read at the Meetings of other Scientific Societies, or have been published in any form, cannot be read at a Meeting of the Institution, nor be admitted to competition for the Telford and Walker Premiums.

ON THE EXPENSE OF SURVEYS.

CAPTAIN TUCKER'S REPORT TO THE ORDNANCE DEPARTMENT.

In obedience to your order of the 22nd of February, 1844, I have the honour to submit the following estimates for the Health of Towns Commission, plans on the scale of five feet to one mile, shewing contour altitudes, or altitudes marked at equal vertical distances, in the streets of towns, contour lines without the towns, sufficient to be serviceable for the sewerage and drainage of them, and including the expense of ascertaining sewers, water-pipes, and gas-pipes, arranged under the following heads:—

1st. Of towns of which the survey is completed.

2nd. Of towns of which the survey is in progress.

3rd. Of towns of which the survey has not been commenced.

No. 1. *Towns Surveyed.*—In the estimate under this head the expense of the surveying and levelling already done is not included, as I have considered them to have been performed for the Ordnance Survey; therefore, I have only charged the additional expense of marking contour altitudes *in* the streets, and contour lines *outside* the towns, ascertaining sewers, water-pipes, and gas-pipes.

The cost of making copies of the plans is inserted, to which the additional cost is added, to shew the cost of copies of the plans with the additional information for sanatory purposes.

No. 2. *Towns in progress for the Ordnance Survey of England.*—The estimate for levelling and marking contours *in* the streets is for the levelling which will be necessary for the improvement of the sewerage and drainage of towns, supposing it to be done for that purpose.

The cost of copies of the plans is the same as for Class No. 1.

No. 3. *Towns of which the Survey is not commenced.* — The surveying, plotting, and drawing are charged, shewing the cost of levelling, contouring, ascertaining sewers, water-pipes, and gas-pipes, as in No. 2.

The expense of fixing points is not included in the estimate.

The expense of surveying varies in proportion to the size or population and the compactness of the town.

The area or extent of the close or compact part of a large town being greater in proportion to the whole area or extent of the town, than the compact part of a small town bears to its whole area or extent, the cost of surveying will be greater in proportion to its area than the cost of a small town; therefore, I have estimated the cost of preparing plans of towns having a population of 10,000, 20,000, 50,000, 100,000, 300,000.

The levelling and marking contour altitudes in the streets embraces the shewing the water-shedding line, and the lines of natural drainage, as accurately as the sinuosities of the streets will allow of their being traced, and the levelling is supposed to be arranged for that *particular* object, as contour lines cannot be laid out within the towns; shewing also a sufficient number of contour altitudes to connect altitudes marked along the line of drainage with equal altitudes marked along the water-shedding lines.

The expenses of levelling and contouring are estimated for towns situated on gentle slopes. For abrupt slopes the expense of levelling will be nearly one-third greater, but the contour altitudes in the streets will be at greater vertical distances, and fewer contour lines will be laid out.

I have considered the towns of 10,000 and 20,000 inhabitants to consist of long branching streets with few cross streets, and requiring less levelling than towns that are compact with numerous cross streets.

The expense of contouring or marking the contour lines outside the town is calculated on the supposition that one-third of the whole area, usually included on the Ordnance plans, will admit of their being laid out, and the expense shewn in the estimate is the average expense per acre for the whole area of the plan.

The levelling performed at Windsor cost 6d·5, per acre, including the levelling for four lines of sections, in addition to that which would have been sufficient for sewerage and marking the contours.

The contouring cost 2·75 per acre.

The contours above the datum mark at the bridge are laid out at four feet vertical distance from each other.

Those below the datum point at two feet vertical distance apart.

The expense of contouring was much increased by the necessity for laying out and surveying the lines before the plan was drawn, in order to complete them before her Majesty's return to the Castle, which caused an increase of 0d·75 to the expense.

The cost of contouring Windsor exceeds the expense per acre, shewn in the estimate for towns, arising from the large extent of country in proportion to the area covered by the town, the contoured area being three-fifths of the area of the plan; whereas, in the estimate for plans of towns, the space or extent of ground on which it will be possible to lay out contour lines is supposed to be one-third only of the area of the plan.

The cost of ascertaining the sewers, water-pipes, and gas-pipes of Windsor, and the Castle, and putting them on the plan, amounted to 1d·3 per acre for the space occupied by the town.

The sewers, water-pipes, and gas-pipes of Manchester have not been ascertained.

The cost of obtaining them for the town of Oldham amounted to 1d·1 per acre.

The sewers and water-pipes, but not the gas-pipes, have been ascertained for Bury at the expense of 0d·28 per acre.

The plans of Oldham and Bury are not sufficiently advanced for the insertion of the sewers; therefore the expense of putting them on the plan is not known.

The expense of ascertaining the sewerage, water, and gas-pipes, varies according to the facilities given by the local authorities in appointing persons to shew their position and the quantity of the sewerage; some places being very deficient, and few or none possess plans.

There is not a plan of the sewers of Oldham, and only one man, eighty years of age, could be found who knew the situation of a principal sewer.

I have not included contingent expenses, as office rent, conveying parties or stores, as, should the commissioners wish to undertake the surveys of towns, these expenses will depend on the strength of the party or parties employed, each of which, I think, should consist of sixteen to twenty *surveyors*, to be divided into two parties, when the towns nearest to each other are small, or to be employed as one party if a town be large, that the survey may be promptly executed.

ESTIMATE OF THE COST PER ACRE OF FIVE FEET PLANS OF TOWNS.

Population of the Towns.	First Class. Copies of Plans of Towns of which the Surveying and Levelling are completed.						Second Class. Copies of Plans of Towns of which the Levelling is not commenced.						Third Class. Plans of Towns of which the Survey is not commenced.						
	Cost of a Copy of the Ordnance Plan, per Acre.	Additional Expenses per Acre for			Total additional Expenses.	Total Cost of the Copy, per Acre.	Cost of a Copy of the Ordnance Plan, per Acre.	Expense per Acre for			Total Cost for Levelling Contours, Sewers, &c.	Total Cost of the Copy, per Acre.	Surveying.	Expense per Acre for			Total Cost of Plans, per Acre.	Total Cost of Plans per Acre, including the Fixation and Calculation of Points.
		Contour Altitudes in the Towns.	Contour Lines without the Towns.	Sewers, Water, and Gas Pipes.				Levelling and Contour Altitudes in the Towns.	Contour Lines without the Towns.	Sewers, Water, and Gas Pipes.				Plotting and Drawing.	Levelling and Contour Altitudes in the Towns.	Contour Lines without the Towns.	Sewers, Water, and Gas Pipes.		
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	s. d.	s. d.	
10,000	8	1·5	1	1·5	4	12	8	4	1	1·5	6·5	14·5	12	21	4	1	1·5	3 3·5	3 8
20,000	9	1·5	1	1·5	4	13	9	4	1	1·5	6·5	15·5	15	22	4	1	1·5	3 7·5	4 0
50,000	11	2·0	1	2·0	5	16	11	5	1	2·0	8·0	19·0	21	25	5	1	2·0	4 6	4 10½
100,000	12	2·0	1	2·0	5	17	12	5	1	2·0	8·0	20·0	28	29	5	1	2·0	5 8	5 9
300,000	14	2·5	1	2·5	6	20	14	6	1	2·5	9·5	23·5	49	33	6	1	2·5	7 6·5	7 11

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